

IN THE CLAIMS:

1-27. **(Cancel)**

28. **(New)** A method of regulating or controlling a cyclically operating internal combustion engine using a computation model by which a cycle or portions of the cycle of the internal combustion engine is, or are, divided into individual cycle parts and the operating condition within each cycle part is determined using measured values, stored and/or applied data in order to obtain actuating variables for operating said internal combustion engine, wherein the computation models for the various individual cycle parts are based on at least partially different assumptions and/or have different simplifications and that the time limits of the cycle parts are at least partially calculated as a function of at least one variable engine operating parameter.

29. **(New)** The method according to claim 28, wherein computation models for the individual cycle parts evolve from an initial condition and algebraically calculate in one step computation variables during duration of the cycle part.

30. **(New)** The method according to claim 28, wherein at least one limit of at least one cycle part is defined by a position of intake and/or exhaust valves.

31. **(New)** The method according to claim 28, wherein at least one cycle part is defined by the completely open condition of the intake and exhaust valves.

32. **(New)** The method according to claim 28, wherein at least one limit of at least one cycle part is defined by a beginning of a combustion process.

33. **(New)** The method according to claim 28, wherein at least one limit of at least one cycle part is defined by an ignition process of a fuel.

34. **(New)** The method according to claim 28, wherein at least one limit of at least one cycle part is defined by an end of the combustion process.

35. **(New)** The method according to claim 28, wherein at least one cycle part is defined by at least one combustion process.

36. **(New)** The method according to claim 28, wherein at least one cycle part is defined by a direction of motion of a piston.

37. **(New)** The method according to claim 28, wherein a limit of at least one cycle part is defined by a top dead center of the piston.

38. **(New)** The method according to claim 28, wherein a limit of at least one cycle part is defined by a bottom dead center of the piston.

39. **(New)** The method according to claim 28, wherein at least one cycle part is defined by the compression process of a gas enclosed in a cylinder.

40. **(New)** The method according to claim 28, wherein at least one cycle part is defined by an expansion process of the gas enclosed in the cylinder.

41. **(New)** The method according to claim 28, wherein the computation of the computation variables of each cycle part is performed in real time.

42. **(New)** The method according to any of the claims 28 through 39, wherein an operating status at an end of a cycle part is used as an initial condition for computing a next cycle part.

43. **(New)** The method according to claim 28, wherein each operating status is defined by at least one variable selected from a group comprising torque, mass flow, in-cylinder charge condition of the cylinders, energy content of exhausts and wall heat flow of at least one cylinder.

44. **(New)** The method according to claim 28, wherein at least one operating variable selected from a group comprising intake pressure, intake temperature and gas composition in a suction pipe is detected as an engine operating parameter.

45. **(New)** The method according to claim 28, wherein at least one operating variable selected from a group comprising exhaust pressure, exhaust temperature and exhaust composition in a exhaust elbow is detected as an engine operating parameter.

46. **(New)** The method according to claim 28, wherein at least one parameter of a valve train mechanism, namely the timing of the intake and/or exhaust valves and/or a effective cross-sectional area of flow of the intake and/or exhaust valves is detected as an engine operating parameter.

47. **(New)** The method according to claim 46, wherein the effective cross sectional areas of flow of the intake and/or exhaust valves are approximated by a rectangular or stepped curve.

48. **(New)** The method according to claim 28, wherein at least one parameter of combustion, namely an injection timing and/or ignition time and/or an amount of fuel injected is detected as an engine operating parameter.

49. **(New)** The method according to claim 28, wherein an engine speed and/or a cylinder wall temperature is determined as an engine operating parameter.

50. **(New)** The method according to claim 28, wherein at least one engine operating parameter is analytically determined.

51. **(New)** The method according to claim 28, wherein at least one engine operating parameter is determined by measurement.

52. **(New)** The method according to claim 28, wherein at least one engine operating parameter is determined analytically and by measurement and that computed and measured values are aligned.

53. **(New)** The method according to claim 52, wherein at least one engine operating parameter selected from the group comprising mass flow, cylinder pressure, air-fuel ratio and torque are determined analytically and by measurement.

54. **(New)** The method according to claim 46, wherein the effective cross sectional areas of flow of the intake and/or exhaust valves are approximated by a mean cross-sectional area of flow.

55. **(New)** The method according to claim 28, wherein, for deducing equations for computation variables, the effective piston speed is approximated by a mean piston speed in at least one cycle part.

56. **(New)** The method according to claim 55, wherein an error resulting from an assumption of a mean piston speed is compensated resolving the equations of the computation variables.